Overview

The HP StorageWorks family of Ultrium tape drives is HP's premier line of tape backup devices. Based on LTO Ultrium format, an open standard with a well-defined six-generation roadmap, HP Ultrium tape drives offer customers the best choice for investment protection relative to their backup and archival requirements. HP pioneered the half-height Ultrium drive, as the only manufacturer offering full-height and half-height models of each generation of Ultrium drives. Delivering the perfect balance of capacity and performance, HP Ultrium half-height drives are designed for server customers in direct attached storage (DAS) environments where hard disk and system bottlenecks can impede data transfer rates. Four generations of half-height drives are available from HP, offering a wide portfolio to meet the backup requirements for entry and midrange servers.

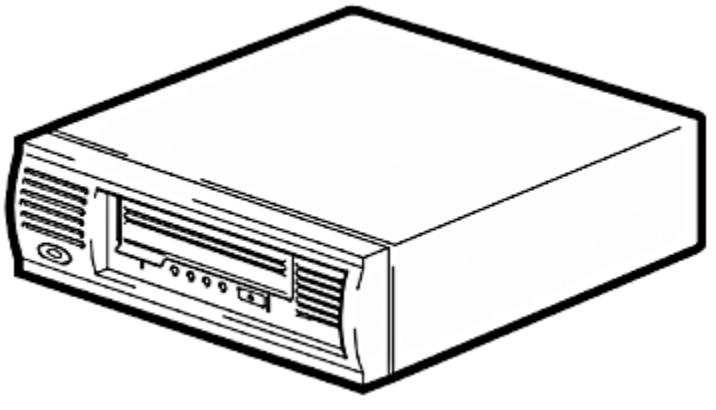
With ultimate reliability and ease of use in mind, even at a 100% duty cycle, HP's rugged design builds on superior LTO technology and adds advanced features to create a new level of data protection. HP Ultrium tape drives employ dynamic data rate matching to adjust to the speed of the host, reducing wear and tear on both drive and media and increasing performance, even on slower hosts. HP's ultra-durable soft-load feature automatically positions the data cartridge, and the highly reliable HP leader-capture mechanism virtually eliminates lost leaders, increasing the success of your backup and restore operations. The included HP Data Protector Express Single Server Edition Software supports the HP tape drive's One-Button Disaster Recovery feature to provide the easiest way to restore data in the event of a disaster. If data is critical to your business, protect it with an HP StorageWorks Ultrium tape drives.

What's New

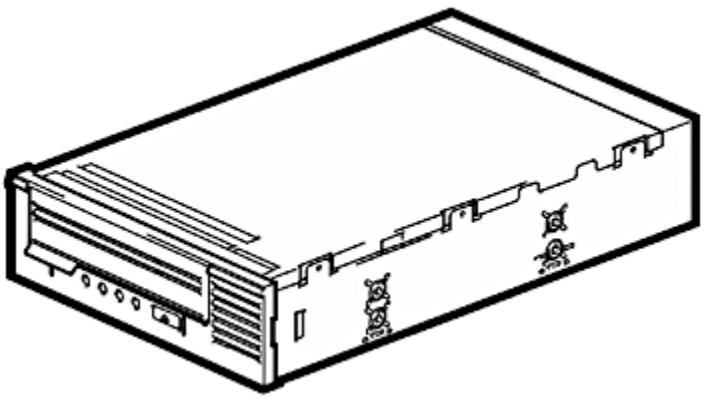
- The new HP StorageWorks LTO-4 Ultrium 1760 represents HP's forth generation half-height tape drive:
  - Delivers a capacity of 1.6 TB of compressed data on a single cartridge.
  - Fastest half-height LTO drive in HP's portfolio with a compressed data transfer rate of 160 MB/sec.
  - AES 256-bit hardware data encryption prevents unauthorized access of tape cartridges.
  - Support WORM (Write-Once, Read-Many) media for meeting regulatory compliance.
  - SAS and SCSI interfaces available.

HP StorageWorks Ultrium 232 Tape Drive

The HP StorageWorks Ultrium 232 tape drive is entry into the LTO portfolio. This affordable superdrive delivers enterprise-class capacity, performance, and reliability. With a compressed capacity of 200 GB per data cartridge and a compressed data transfer rate of 115 GB per hour, this LTO-1 drive is read- and write-compatible with all first-generation Ultrium drives and media, and its media can be read by any LTO-1, LTO-2, or LTO-3 drive from any manufacturer.



Ultrium 232 External Tape Drive

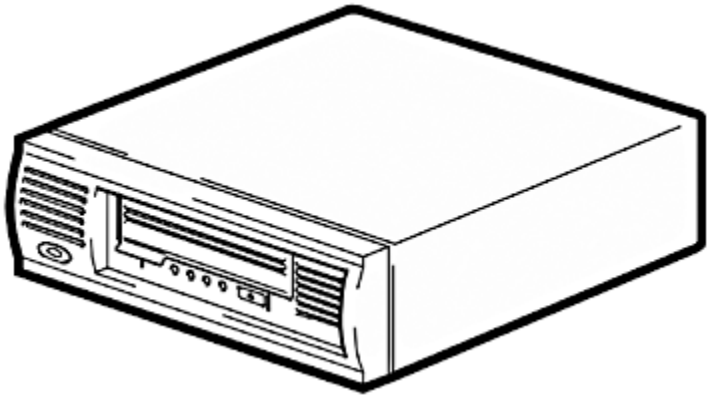


Ultrium 232 Internal Tape Drive

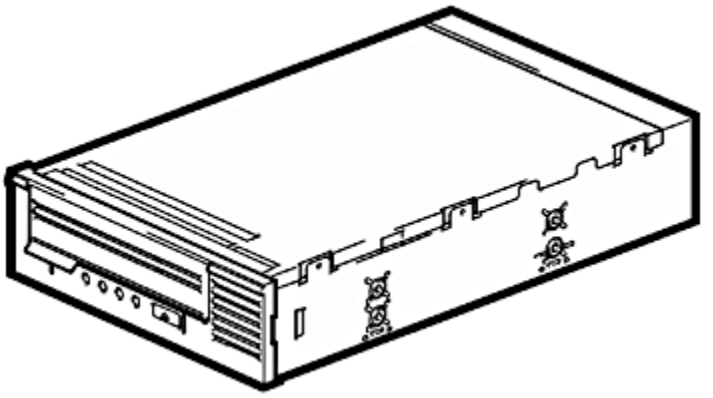
Overview

HP StorageWorks Ultrium 448 Tape Drive

The HP StorageWorks Ultrium 448 tape drive is HP's second generation of half-height LTO tape drive technology. Offering a choice of both SCSI and SAS models, this midrange capacity, low cost tape drive delivers a compressed storage capacity of 400 GB per data cartridge and a compressed data transfer rate of 172 GB per hour, double the capacity and one and a half times the performance of the Ultrium 232 tape drive. The Ultrium 448 tape drive is fully read and write compatible with all first- and second-generation Ultrium drives and media. These features, combined with low pricing, make the Ultrium 448 the ideal direct-attach and network backup solution for entry-level and midrange servers where capacity and low cost of ownership are critical. New SAS-based models allow for direct connect to SAS-based HP ProLiant servers via embedded SAS controller or SAS HBA.



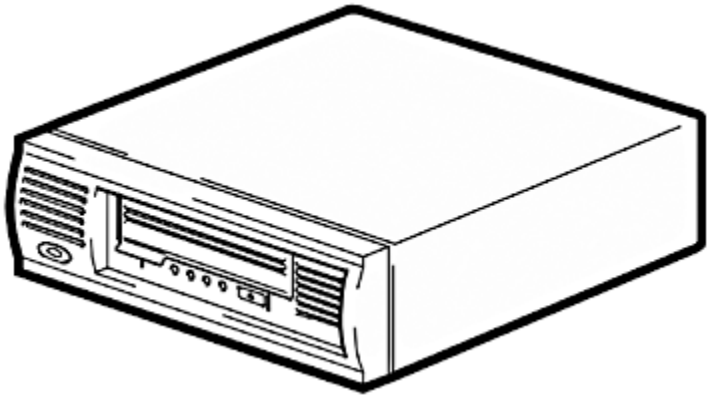
Ultrium 448 External Tape Drive



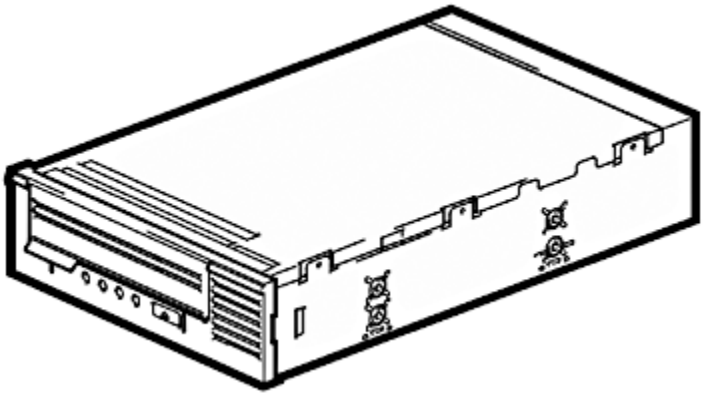
Ultrium 448 Internal Tape Drive

HP StorageWorks Ultrium 920 Tape Drive

The HP StorageWorks Ultrium 920 tape drive is HP's third generation of half-height LTO tape drive technology. The Ultrium 920 delivers a compressed storage capacity of 800 GB per data cartridge and a compressed data transfer rate of 432 GB per hour, two and a half times faster than the previous generation Ultrium 448 tape drive. Available in both SCSI and SAS models, the Ultrium 920 is ideal for midrange and departmental servers. The Ultrium 920 Tape Drive is fully read and write compatible with all second-generation Ultrium drives and media and offers further investment protection through its backward-read compatibility with first-generation Ultrium media. For IT organizations with stringent, long-term data retention requirements, the Ultrium 920's WORM (Write-Once, Read-Many) data protection feature offers a simple and secure method for archiving records as part of a compliance solution to meet the toughest of industry regulations.



Ultrium 920 External Tape Drive

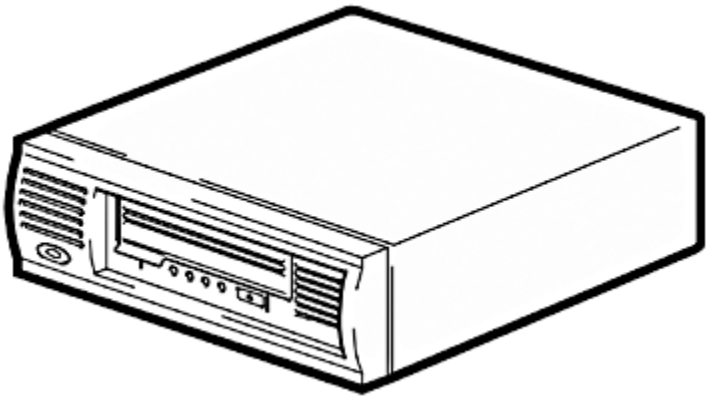


Ultrium 920 Internal Tape Drive

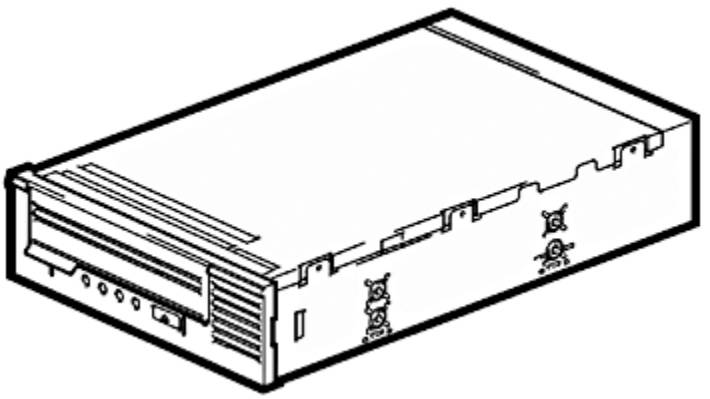
Overview

HP StorageWorks LTO-4 Ultrium 1760 Tape Drive

The HP StorageWorks LTO-4 Ultrium 1760 Tape Drive is HP's fourth-generation of LTO tape drive technology capable of storing up to
The HP StorageWorks LTO-4 Ultrium 1760 Tape Drive is HP's fourth-generation of half-height LTO tape drive technology capable of storing up to 1.6 TB per cartridge in under 3 hours. Available in both SCSI and SAS models, HP Ultrium half-height drives are designed for server customers in direct attached storage (DAS) environments where hard disk and system bottlenecks can impede data transfer rates. To further protect the most sensitive data, AES 256-bit hardware data encryption provides easy-to-enable security to prevent unauthorized access of tape cartridges. By using LTO-4 hardware data encryption, not only is data fully capable of being compressed therefore maximizing capacity, encrypted backups are completed without a loss in performance. Capable of data transfer rates up to 160 MB/sec, HP's exclusive Data Rate Matching feature further optimizes performance by matching speed of host to keep drives streaming and enabling the fastest performance of any tape drive in the industry. The Ultrium 1760 provides investment protection with full read and write support with LTO-4 and LTO-3 media, and the ability to read LTO-2 cartridge. By doubling the capacity of previous generation Ultrium drives, HP customers now require fewer data cartridges to meet their storage needs, significantly reducing their IT costs and increasing their ROI.



LTO-4 Ultrium 1760 External Tape Drive



LTO-4 Ultrium 1760 Internal Tape Drive

Models

Ultrium 232 Tape Drive	HP StorageWorks Ultrium 232 SCSI Internal * 0D1 will appear after this part number on your sales order if factory integration is indicated.	DW064A*
	HP StorageWorks Ultrium 232 SCSI External	DW065B
Ultrium 448 Tape Drive	HP StorageWorks Ultrium 448 SCSI Internal * 0D1 will appear after this part number on your sales order if factory integration is indicated.	DW016A*
	HP StorageWorks Ultrium 448 SCSI External	DW017B
	HP StorageWorks Ultrium 448 SCSI Array Module * 0D1 will appear after this part number on your sales order if factory integration is indicated. NOTE: Offline hot-swap tape drive for HP StorageWorks Tape Array 5300.	DW019A*
	HP StorageWorks Ultrium 448 SCSI Rack-mount * 0D1 will appear after this part number on your sales order if factory integration into a rack is indicated. NOTE: Single drive bundled with a 1U Rack-mount enclosure.	DW028A*
	HP StorageWorks Ultrium 448 SAS Internal * 0D1 will appear after this part number on your sales order if factory integration is indicated.	DW085A*
	HP StorageWorks Ultrium 448 SAS External	DW086A
Ultrium 920 Tape Drive	HP StorageWorks Ultrium 920 SCSI Internal * 0D1 will appear after this part number on your sales order if factory integration is indicated.	EH841A*
	HP StorageWorks Ultrium 920 SCSI External	EH842A*
	HP StorageWorks Ultrium 920 SCSI Rack-mount * 0D1 will appear after this part number on your sales order if factory integration into a rack is indicated. NOTE: Single drive bundled with a 1U Rack-mount enclosure.	EH903A
	HP StorageWorks Ultrium 920 SAS Internal * 0D1 will appear after this part number on your sales order if factory integration is indicated.	EH847A*
	HP StorageWorks Ultrium 920 SAS External	EH848A

Models

Ultrium 1760 Tape Drive	HP StorageWorks LTO-4 Ultrium 1760 SAS Internal * 0D1 will appear after this part number on your sales order if factory integration is indicated.	EH919A*
	HP StorageWorks LTO-4 Ultrium 1760 SAS External	EH920A
	HP StorageWorks LTO-4 Ultrium 1760 SAS Rack-mount * 0D1 will appear after this part number on your sales order if factory integration into a rack is indicated. NOTE: Single drive bundled with a 1U Rack-mount enclosure.	EH946A*
	HP StorageWorks LTO-4 Ultrium 1760 SCSI Internal * 0D1 will appear after this part number on your sales order if factory integration is indicated.	EH921A*
	HP StorageWorks LTO-4 Ultrium 1760 SCSI External	EH922A

Key Features

- Affordable LTO technology
- Enterprise-class capacity and reliability
- Compact half-height form factor
- HP One-Button Disaster Recovery (OBDR) restores your entire system at the touch of a button
- High-capacity drives that store up to 1.6 TB of data on a single cartridge with 2:1 compression
- Data rate matching continuously adjusts the speed of the tape drive to that of the server or network environment, which increases performance, reduces mechanical wear on the drive, and extends tape life
- Fully read-and-write compatible with Ultrium drives and media from other manufacturers
- Includes HP Data Protector Express Single Server Edition Software for backup/recovery software and the Data Protector Express Bare Metal Disaster Recovery option, see: http://www.hp.com/go/dataprotectorexpress/sse
- Internal, external, array module and rack-mounted models available
- Active head cleaning provides automated cleaning that increases head life and reduces the need for using the cleaning cartridge
- Lower power consumption for maximum reliability at minimum cost
- Soft-load feature automatically takes the data cartridge and moves it into the load position
- Advanced tape leader capture design ensures fail-safe cartridge loading Internal, external, hot-swap, and rack-mounted models are available
- Includes HP StorageWorks Library and Tape Tools to help with installation, management, and troubleshooting

Customer Benefits

Affordable	• High capacity combined with low media cost delivers an exceptionally low cost of ownership
Compact	• Half-height form factor saves space and fits in a wide range of servers and workstations
Dependable	• Employs the same high standards for data integrity as HP's full-height Ultrium tape drives
High capacity	• Stores all your data on a single cartridge
Fast	• Minimizes network interruption and completes the backup within your backup window
Easy	• Supports HP One-Button Disaster Recovery (OBDR), simply the easiest way to restore data in the event of a disaster
Manageable	• Includes superior management capabilities that makes it easy to install, use and support
Well-connected	• Compatible with leading operating systems, backup software and servers
Open	• Based on LTO technology, which delivers the competitive benefits of an open format
Reliable	• High-integrity data path including read and write DRAM protects your data

Product Highlights

LTO Ultrium Technology

Linear Tape-Open technology was developed by three leaders in the storage industry - HP, IBM, and Quantum - who brought together their combined expertise in tape technology to develop an entirely new format based on the best of existing technologies. Because LTO Ultrium technology was a new format, it required no cumbersome support of legacy formats, so it could be designed without compromising on reliability or performance. The LTO Program, has developed a well-defined six-generation roadmap, which has been executed right on schedule.

Ultrium LTO-1 and LTO-2 tape drive technologies from HP use a linear format of 384 tracks and 512 tracks (respectively), writing eight tracks simultaneously. Ultrium LTO-3 and LTO-4 tape drive features a breakthrough in recording technology by writing sixteen tracks simultaneously on a linear format of 704 tracks and 896 tracks (respectively). The data is written in a serpentine pattern; the tape reverses direction after each set of eight tracks is written. This provides higher density recording, enabling customers to lower costs and increase efficiency by storing more data on a single tape in an industry standard format.

The LTO standard for backward compatibility is to write back one generation and read back two generations; therefore:

- First-generation Ultrium drives (HP Ultrium 230, HP Ultrium 232) read and write LTO-1 media
- Second-generation Ultrium drives (HP Ultrium 460, HP Ultrium 448) read and write LTO-1 and LTO-2 media.
- Third-generation Ultrium drives (HP Ultrium 920, Ultrium 960) read and write LTO-2 and LTO-3 media and also read LTO-1 media.
- Fourth-generation Ultrium drives (Ultrium 1760, Ultrium 1840) read and write LTO-3 and LTO-4 media and also read LTO-2 media.

As part of the LTO open standard, all HP tape drives and media offer the same standards of compatibility with tape drives and media manufactured by other LTO vendors.

LTO data compression (LTO-DC) is an enhanced version of Advanced Lossless Data Compression (ALDC) hardware compression. Compression is automatically turned off if the compressed data would cause an overall expansion in data size, hence optimizing the available capacity on the media. This system is used in Ultrium generation 1, 2, and 3 products.

The decision about what next technology you should buy into should be based on your future, not your past, investment. Choose the Ultrium format when you need the following advantages:

- Maximum reliability, capacity and performance
- Compatibility with a broad range of operating systems and servers (e.g., a mixed system environment)
- A legacy-free technology that uses the best attributes from a wide range of tape technologies without any compromises for backward compatibility requirements
- A solid roadmap for future generations of the technology
- An open format available from multiple vendors
- Lowest media cost of any 'superdrive' tape technology

Product Highlights

Data Rate Matching

Data Rate Matching combines sophisticated buffer management with HP's exclusive Variable Adaptive Tape Speed technology to allow the tape drive to match its transfer rate to the host speed dynamically and continuously across the wide range of transfer rates. This feature ensures that the tape drive continues to stream data regardless of the environment, and brings two big advantages:

- It minimizes rewinding and repositioning of the tape, reducing physical wear on drive and media, thus increasing reliability.
- It optimizes backup performance, and maximizes overall efficiency allowing the drive to respond immediately to any speed changes from the host.
- It minimizes the power requirements for the drive by reducing the number of repositions needed.

Software in the Box

The HP StorageWorks Ultrium tape drives include HP Data Protector Express Single Server Edition Software. This easy to use backup application, based on Data Protector Express, robustly protects a single Windows, Linux or NetWare server. Also included is the Data Protector Express Bare Metal Disaster Recovery (BMDR) option which provides automated system recovery of the server following a major hardware or software failure. The fastest method to recovery the server is to use the Data Protector Express BMDR option and the One-Button Disaster Recovery feature of the HP StorageWorks Ultrium tape drives. For more information about Data Protector Express Single Server Edition please visit: http://www.hp.com/go/dataprotectorexpress/sse.

As well as getting the Data Protector Express Single Server Edition software as part of the HP StorageWorks Ultrium tape drives solution, purchasers can easily and economically upgrade to the class-leading Data Protector Express backup/recovery software. This is a special part number, only available for registered users of Data Protector Express Single Server Edition, that gives a significant discount off the regular price of Data Protector Express, to recognize the value of the in-box software. For more information about upgrading Data Protector Express Single Server Edition to Data Protector Express visit: http://www.hp.com/go/dataprotectorexpress/sse/upgrade.

If the HP StorageWorks Ultrium tape drive is for a large environment that requires UNIX support and/or enterprise class application and feature support then HP Data Protector software is the recommended backup/recovery software. For more information and evaluation software please visit: http://www.hp.com/go/dataprotector.

HP One-Button Disaster Recovery (OBDR)

HP StorageWorks One-Button Disaster Recovery is an exclusive feature of HP tape drives that provides fast and simple disaster recovery on HP ProLiant servers. OBDR is a firmware-driven utility that can restore a server's operating system, software applications, and data using a single tape cartridge. Depending on the size of the data set, OBDR can provide system recovery in less than one hour, reducing the recovery window by more than 50 percent and minimizing the risks and costs associated with downtime. There's no longer a need to search for software disks and manuals or make a new set of disaster recovery disks each time the network configuration is altered or a peripheral is added. The sheer simplicity of OBDR means less human error. Backup and disaster recovery preparation, previously two separate tasks, now become one process. For more information about OBDR, visit the HP website at: http://www.hp.com/go/obdr.
For a current list of servers, workstations, and software that support OBDR, check the tape backup compatibility pages on the HP website at: http://www.hp.com/go/connect.

Product Highlights

WORM (Write-Once, Read-Many) Drive and Media Support

Critical to the success of data retention policies in highly regulated environments is the ability to store and manage data in an unalterable state. Following stringent guidelines set forth by regulatory agencies such as the SEC and HIPPA, IT organizations must now integrate new solutions and policies that can verify the integrity of stored data for periods that can extend well beyond seven years.

Ultrium 920 and Ultrium 1760 tape drives feature the ability to archive and store data in a non-rewriteable format that meets the most stringent regulatory guidelines. Using a combination of integrated fail-safe features in the drive firmware, cartridge memory, and tape formatting, the Ultrium 920 and Ultrium 1760 can archive large amounts of data for periods of up to 30 years in a secure, untampered state. Since all Ultrium 920 and Ultrium 1760 tape drives include support for both rewritable and WORM media, IT organizations can now easily integrate a secure, long-term archiving solution into their current data protection strategy. As compared to other technologies that feature support for WORM storage, Ultrium 920 and Ultrium 1760 tape drives offer the advantages of:

- A single drive to support all backup and archiving needs
- Two distinctive tape cartridges to easily distinguish and manage both rewriteable and WORM data cartridges
- A specially designed WORM data cartridge with multiple integrated fail-safe features to prevent accidental or intentional overwriting of data
- High-capacity, low-cost HP WORM media that can store up to 1.6 TB of data on a single data cartridge
- Support from many backup and archiving software vendors, providing the most comprehensive and mainstream support in the industry
- The LTO open standard that offers greater choice and compatibility across all third-generation Ultrium products

NOTE: While all HP Ultrium 920, Ultrium 960, Ultrium 1760 and Ultrium 1840 tape drives support LTO Ultrium WORM media, some third-generation LTO Ultrium tape drives from other manufacturers may not include read and write support for LTO Ultrium WORM media. For non-HP third-generation LTO Ultrium tape drives, please check the manufacturers' specifications to ensure this support is provided if you are using your WORM media. If WORM support is not provided, the drive will eject the WORM tape cartridge immediately upon insertion into to the tape drive.

HP Ultrium Storage Media

HP recommends that you use HP-branded cartridges in your HP Ultrium tape drive to assure the highest level of protection for your valuable data. Our test program for HP Ultrium media is the most thorough and comprehensive in the industry.

All HP cartridges must satisfy an exhaustive battery of additional tests that relate directly to real life situations, where real data and real businesses are at stake. The benefit of the HP brand specification for media is consistent quality. Through the testing of thousands of HP drives and HP cartridges, the ideal formulation for backup performance is defined and then continuously monitored. This hugely resource-intensive process is unique to HP and affords deep insight into the HP+HP backup solution for a wide range of environments and duty cycles. Your best choice for ease of support and maximum dependability is to use HP-branded Ultrium cartridges at all times.

Product Highlights

Management

HP Ultrium tape drives and automation are supported by HP StorageWorks Library and Tape Tools (LTT). This set of easy-to-use utilities makes the installation and maintenance of HP tape drives and devices simple:

- Verifies installation of the drive
- Tests and verifies the health of the drive and media
- Provides HP support with detailed device information
- Offers multiple options for finding and upgrading new firmware
- Aids in performance optimization
- Included with each Ultrium tape drive and available via free download supporting all HP tape products

Instructions and downloads of Library and Tape Tools are available at:
http://www.hp.com/country/us/eng/software_drivers.html

Compatibility

HP's extensive compatibility testing program assures that your HP StorageWorks Ultrium tape drive works with leading servers, operating systems, and backup applications - and not just those sold by HP. HP Ultrium tape drives work seamlessly on many platforms, making them especially suitable if you have a mixed system environment. For the latest list of servers, workstations, operating systems, and backup software that support HP Ultrium tape drives, check the tape backup compatibility pages on our Web site at: http://www.hp.com/go/connect.

SAS Installation

HP StorageWorks SAS tape drives are available as internal and external models. Both models are supplied with a special split cable that allows you to connect to an internal port (if available) on the embedded SAS controller inside the server. While connection via the split cable provides the most cost-effective way of connecting the tape drive to an HP ProLiant server, this will require a clear understanding of your server's current SAS configuration before installing.

Some server models will allow direct connect to a spare SAS connector on the native SAS controller. Other servers which do not have a spare connector, might require you to reconfigure hard disk drive bays and in a few instances, you may also lose the use of one of the hard disk drive bays and will need to rebuild your RAID configuration. In these configurations the simple, recommended solution is connecting to an option SAS host bus adapter and optional SAS cable.

For the most up-to-date information about recommended SAS HBAs and supported cabling configurations with your make and model of server, always refer to: http://www.hp.com/go/connect

HP Server Compatibility

SAS-based HP StorageWorks Ultrium tape drives are supported on HP ProLiant ML and DL servers

SCSI-based HP StorageWorks Ultrium tape drives are supported on the following classes of HP systems:

- HP ProLiant DL servers
- HP ProLiant ML servers
- HP AlphaServers
- HP Integrity servers
- HP 9000 servers
- HP workstations

SCSI-based HP StorageWorks Ultrium tape drives are also supported on server platforms from third-party manufactures including:

- Dell
- IBM
- Sun

For details of which tape drive models work with which systems, including third-party systems, visit: http://www.hp.com/go/connect for the latest hardware compatibility information.

Cables and Termination

All cables required for internal and external connection to HP servers are provided with your tape drive. For non-HP servers, please consult your manufacturers' server specifications to determine if the cable provided with your Ultrium tape drive is appropriate for use with that server. No terminator is required for internal models (assumes use of terminated cable). The external model features "auto-termination" - no terminator is required. New SAS-based Ultrium models ship with a 4-channel split cable which allows direct attach from embedded SAS controller on host to a tape drive and remaining 3 channels to disk.

Compatibility

Performance Tuning	You will need to connect SCSI-based Ultrium drives to a dedicated SCSI Host Bus Adaptor (HBA) or integrated SCSI interface that is Ultra 160 or higher. Please reference the "Options" section of these QuickSpec for all supported SCSI adapters and interfaces. SAS-based Ultrium drives must be connected to a suitable SAS Host Bus Adapter (HBA); visit http://www.hp.com/go/connect for details of all supported configurations. To achieve full performance with your tape drive, do not use the native backup application within the operating system (e.g., NT® Backup, Windows® 2000 Backup). For full details of supported backup applications, please visit: http://www.hp.com/go/connect
OS Support	Microsoft® Windows, Novell NetWare, HP-UX, Red Hat Linux, United Linux, IBM-AIX, Sun Solaris and other operating systems. NOTE: Please visit: http://www.hp.com/go/connect for the latest compatibility information.
Backup Software Support	All HP Ultrium tape drives are qualified with HP Data Protector, HP Data Protector Express, Symantec Backup Exec, CA BrightStor ARCServe IT, Yosemite Backup, Commvault Galaxy, EMC Networker, EMC Retrospect, IBM Tivoli TSM, Novastor NovaBackup, and other backup applications NOTE: Please visit http://www.hp.com/go/connect for the latest compatibility information.

Service and Support, HP Care Pack, and Warranty Information

HP Care Pack Information

HP Care Pack Services offer upgraded service levels to extend and expand your standard product warranty with easy-to-buy, easy-to-use support packages that help you make the most of your hardware and software investments. They let you choose the support levels that meet your business requirements, from basic to mission-critical. They help you contain total cost of ownership.

HP Care Pack warranty extensions can be purchased along with HP products to cost-effectively upgrade or extend your warranty. For many products, post-warranty HP Care Pack services are available when your original warranty has expired.

Why purchase an HP Care Pack service?

Your standard warranty protects against product defects. HP Care Pack Services help you guard against unplanned downtime, which can reduce your productivity and profitability. These convenient service packages:

- Protect your investment in HP products
- Provide consistent, predictable levels of support across your entire department or business
- Ease budget planning with fixed-cost support that includes parts and labor
- Give you direct access to proven technical and problem-solving expertise
- Offer a choice of response-time and repair-time commitments
- Deliver prompt, measurable results
- Are available whenever and wherever you do business

HP Care Pack availability may vary by country and product.

Supporting your Adaptive Enterprise journey

HP Services helps you make the Adaptive Enterprise real for your organization. The breadth, depth, and quality of HP hardware and software support services can help you improve the performance of your IT support processes and resolve the complex software and hardware problems that tax user productivity. HP Care Pack services help you increase IT environment stability, efficiency, and agility from the deskto to the data center, and improve the productivity of your employees.

Warranty and Services Included with the Produ

Hewlett-Packard provides a 3-year, next-day, parts exchange, limited warranty for the StorageWorks Ultrium tape drive, plus 9x5 phone support for the duration of the warranty.

For more information about HP's Global Limited Warranty and Technical Support, visit:
ftp://ftp.compaq.com/pub/products/storageworks/warranty/EN_321708-008.pdf

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Service and Support, HP Care Pack, and Warranty Information

Recommended Services

In order to maximize ROI and product uptime, and minimize the cost of ownership, Hewlett Packard recommends:

3 years 24 x 7 Hardware Support

- Guards against downtime, which reduces productivity and profitability
- Eases budget planning with fixed-cost support that includes parts and labor
- Direct access to proven technical and problem-solving expertise

3 years 24 x 7 Software Support

- Improve the productivity of system managers and operators
- Improve system performance and reduce downtime due to software defects
- Expedite problem resolution through expert-level technical resources
- Enjoy consistent service coverage across geographically dispersed sites
- Update HP and selected third-party software at a predictable cost
- Take advantage of subscription savings on software updates
- Keep your license compliancy up-to-date

Available HP Care Pack Services

Extend your product warranty with a wide choice of cost-saving support packages.

HP Care Pack services are sold by HP and HP authorized enterprise and commercial resellers. Services for customers purchasing via direct and enterprise resellers are quoted using HP order configuration tools. Additional information about HP Care Pack service features and benefits is available at: http://www.hp.com/hps/carepack/services/.

Key for HP Care Pack service availability in the table below:

E = Service available for customers purchasing direct and via enterprise resellers
C = Service available for customers purchasing via commercial resellers
N/A = Service not applicable

HP Care Pack Services	Service Available
Deployment and Per Event Services	
HP Installation	E/C
HP Installation & Startup	N/A
HP Implementation	N/A

For more information about deployment and per event services for HP storage products, visit: http://www.hp.com/hps/storage/.

Service and Support, HP Care Pack, and Warranty Information

HP Care Pack Services Availability Services	1 yr	3 yr	4 yr	5 yr
HP Next Day Hardware Support	E/C	E/C	C	C
HP 4 Hr, 9x5 HW Support	E/C	E/C	C	C
HP 4 Hr, 13x5 Hardware Support	E/C	E/C	C	C
HP 4 Hr, 24x7 Hardware Support	E/C	E/C	C	C
HP 6 HR Call-to-Repair HW Support	E/C	E/C	C	C
HP Software Support	E/C	E/C	C	C
HP Software Support 24x7	E/C	E/C	C	C
HP Support Plus	E/C	E/C	C	C
HP Support Plus 24	E/C	E/C	C	C
HP Proactive Essentials 9x5, 10 SW Incidents	NA	NA	NA	NA
HP Proactive Essentials 9x5, 25 SW Incidents	NA	NA	NA	NA
HP Proactive Essentials 9x5 Unlimited	NA	NA	NA	NA
HP Proactive Essentials 24x7, 25 SW Incidents	NA	NA	NA	NA
HP Proactive Essentials 24x7, 50 SW Incidents	NA	NA	NA	NA
HP Proactive Essentials 24x7 Unlimited	NA	NA	NA	NA
HP Proactive 24 Service*	NA	NA	NA	NA
HP Critical Service*	NA	NA	NA	NA

* Both Proactive 24 & Critical Service only relate to 'reactive elements'. 'Proactive elements' are available on time & materials basis. (SW is supported separately per package).

To find HP Care Pack Services available via HP authorized commercial resellers, visit
http://h30125.www3.hp.com/csn/salesmktg/elfpack/elf_nonlkup_ctrylang.asp?code=ELNL

Important Notice for Tape Drives Installed in a 1U or 3U Rack Mount Kit

NOTE: These Care Packs do not apply to Tape Drives mounted in a 1U or 3U Rack Mount Kit. The HP Rack Mount Kit Care Pack covers the all possible configurations of Tape Drives. Hence the Care Packs for 1U & 3U Rack Mount Kit covers all encumberant drives.
Please follow the following url for the correct Care Pack Services and descriptions.
http://h18000.www1.hp.com/products/quickspecs/10854_div/10854_div.pdf

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Important Notice for Internal Tape Drives Installed in an HP Server

NOTE: These Care Packs do not apply to Internal Tape Drives because they do not have Care Packs associated with them if they are mounted in an HP Server. Hence the Care Packs for the HP Server covers all encumberant drives.
Please follow the following url for the correct Care Pack Services and descriptions.
For Proliant use: http://h18000.www1.hp.com/products/quickspecs/ProductBulletin.html
For BCS use: http://h18000.www1.hp.com/products/quickspecs/ProductBulletin.html

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Service and Support, HP Care Pack, and Warranty Information

Important Notice for Tape Drive Modules Installed in an HP Tape Array

NOTE: These Care Packs do not apply to Tape Drives mounted in an HP Tape Array because they do not have Care Packs associated with them. Hence the Care Packs for the HP Tape Array covers all encumberant drives.
Please follow the following url for the correct Care Pack Services and descriptions.
http://h18000.www1.hp.com/products/quickspecs/11878_div/11878_div.pdf

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Deployment and Per Event Service Descriptions

Installation is part of a suite of HP deployment services that are designed to provide a quick response to your need for additions to your organization's IT infrastructure, while giving you the peace of mind that comes from good knowing your hardware and software products from HP and selected third parties have been installed in a professional manner by a highly skilled HP service delivery specialist.

HP Installation Service

- Expedited installation, with all service prerequisites met before the installation is performed
- Installation in accordance with manufacturer's specifications, enhancing the supportability of your HP-installed hardware and software
- Service delivery at a mutually scheduled time Allows your IT resources to stay focused on their core tasks and priorities
- Availability of an HP service specialist to answer questions during the onsite delivery of this service
- Service planning
- Service deployment
- Installation verification tests

HP Care Pack Service Product Numbers

Enterprise & Commercial Purchased Care Packs
('A' stands for physical Care Pack, 'E' for electronic Care Pack)

Product Description	Product Number
Tape Installation HW Installation Only	U2090A/E
HW, "3-year", "Next Business Day", "9x5", "on-site"*	H3157A/E
HW, "3-year", "4-hour", "13x5", "on-site"	H4617A/E
HW, "3-year", "4-hour", "24x7", "on-site"	H4622A/E
HW, "3-year", "6hr Call to Repair", "24x7", "on-site"	U6359A/E
HW, "4-year", "4-hour", "13x5", "on-site"	U9342A/E
HW, "4-year", "4-hour", "24x7", "on-site"	U9343A/E
HW, "5-year", "4-hour", "13x5", "on-site"	U9344A/E
HW, "5-year", "4-hour", "24x7", "on-site"	U9345A/E
HW, "1-year", "Next Business Day", "9x5", "on-site", "Post Warranty"	UA454PE
HW, "1-year", "4-hour", "13x5", "on-site", " Post Warranty "	UA455PE
HW, "1-year", "4-hour", "24x7", "on-site", " Post Warranty "	UA456PE
HW, "1-year", "6hr Call to Repair", "24x7", "on-site", Post Warranty"	UA457PE

Enterprise Purchased Care Packs

Service and Support, HP Care Pack, and Warranty Information

Product Description	Drive Band	Install Band	Product Number
Tape Installation HW Installation Only	N/A	596	HA113A1
HW, "3-year", "next-day", "13x5", "on-site"	450	N/A	HA101A3
HW, "3-year", "4-hour", "13x5", "on-site"	450	N/A	HA103A3
HW, "3-year", "4-hour", "24x7", "on-site"	450	N/A	HA104A3
HW, "3-year", "6hr CTR", "24x7", "on-site"*	450	N/A	HA105A3
SW, "3-year", "Phone-in", "9x5"	N/A	N/A	HA106A3
SW, "3-year", "Phone-in", "24x7"	N/A	N/A	HA107A3
HW Only, Support Plus, "3-year", "13x5"	450	N/A	HA109A3
HW Only, Support Plus 24, "3-year", "24x7"	450	N/A	HA110A3
HW Only, Proactive 24, "3-year", "24x7"*	450	N/A	HA111A3
HW Only, Critical Service, "3-year", "24x7"*	450	N/A	HA112A3

*NOTE: Both Proactive 24 & Critical Service only relate to 'reactive elements', 'proactive elements' are available on time & materials basis. (SW is supported separately per package).
NOTE: The Care Pack information quoted above relates to 3 year offerings only, 1yr / 4yr & 5yr packs are available for each offering (replace A3 with A1, A4 or A5).

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eSupport

HP eSupport is a portfolio of technology-based services that assist you with managing your business environment - from the desktop to the data center.

Support Portal

The HP support portal provides one-stop access to the information, tools and services you need to manage the daily operations of your IT environment.

Features include:

- Access to self-solve tools (including search technical knowledge base)
- Efficient logging and tracking of support cases
- Collaboration with other business and IT professionals
- Download of patches and drivers
- Access to diagnostic tools
- Proactive notification of relevant information

Access to certain features of the support portal requires an HP service agreement. To access the support portal, visit http://www.hp.com/support.

HP Education Services

For more information about HP Education Services for Storage and SAN, visit http://h10076.www1.hp.com/education/curr-storsan.htm

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Service and Support, HP Care Pack, and Warranty Information

Additional Services Information

For more information about Deployment, Per Event, Consulting and Education services for HP Storage, visit: http://www.hp.com/hps/storage/

For more information about HP Care Pack services for storage products, visit: http://www.hp.com/hps/carepack/storage/cp_networked.html

For more information about HP storage software, services and updates, visit: http://h18006.www1.hp.com/storage/software.html

If you have specific questions, contact your local HP representative. Contact information for a representative in your area can be found at "Contact HP" http://www.hp.com/

Options

Host Bus Adapters, Controllers, and Accessories for ProLiant Servers	SCSI Controllers	
	HP SC11Xe Host Bus Adapter NOTE: Recommended SCSI HBA for connecting Ultrium tape drives to ProLiant DL servers.	412911-B21
	64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2 NOTE: This controller may also be used for connecting HP Ultrium tape drives to 3rd party server platforms such as Dell, IBM, and Sun. Please refer to the HP Tape Backup Products Compatibility website at: http://www.hp.com/go/connect for more information.	374654-B21
	SAS Controllers	
	HP SC44Ge SAS Host Bus Adapter NOTE: Recommended SAS HBA for connecting HP StorageWorks tape drives to HP ProLiant servers.	416096-B21
	HP Smart Array P400/256MB Controller	405132-B21
	HP Smart Array P400/512MB Controller	411064-B21
	HP 8 Internal Port SAS HBA with RAID 0/1 NOTE: PCI-X interface	347786-B21
Host Bus Adapters, Controllers, and Accessories for HP PA-RISC and IPF servers	64-Bit/133-MHz Dual Channel Ultra320 SCSI Adapter Please refer to the HP Tape Backup Products Compatibility website at http://www.hp.com/go/connect for more information on support for HP PA-RISC and IPF servers.	A7173A
Host Bus Adapters, Controllers, and Accessories for HP AlphaServers	32-Bit PCI to Single Channel Wide-Ultra2 SCSI Adapter	3X-KZPCA-AA
	Triple-Function Combo Adapter: LVD / SCSI II, 10/100 UTP Ethernet, and 2D Graphics	3X-DEPVZ-AA
	Dual Channel 64/66-MHz PCI-to-SCSI Ultra160 Host Bus Adapter	3X-KZPEA-DB
Host Bus Adapters for Third-Party Servers	64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2 NOTE: This SCSI controller supports a wide range of connectivity to non-HP 32-bit servers. Please refer to the HP Tape Backup Products Compatibility website at http://www.hp.com/go/connect for more information on support for non-HP 32-bit server platforms using your HP Ultrium tape drive. HP Ultrium tape drives are supported on a wide range of non-HP server using third-party SCSI controllers and host bus adapters. NOTE: Please refer to the HP Tape Backup Products Compatibility website at http://www.hp.com/go/connect for more information on Ultrium support for non-HP servers using third-party controllers and adapters.	374654-B21

Options

Media	HP LTO1 Ultrium 200 GB Data Cartridge (recommended for Ultrium 232) NOTE: Write and read support with Ultrium 230, Ultrium 232, Ultrium 448 and Ultrium 460. Read-only support with Ultrium 920 and Ultrium 960	C7971A
	HP LTO2 Ultrium 400 GB Data Cartridge (recommended for Ultrium 448) NOTE: Write support with Ultrium 448, Ultrium 460 Ultrium 920 and Ultrium 960	C7972A
	HP LTO3 Ultrium 800GB RW Data Cartridge (recommended for Ultrium 920) NOTE: Write support with Ultrium 920, Ultrium 960, Ultrium 1760 and Ultrium 1840. Read-only support with Ultrium 1760 and Ultrium 1840	C7973A
	HP LTO3 Ultrium 800GB WORM Data Cartridge (recommended for Ultrium 920) NOTE: This data cartridge only supports Write-Once Read-Many recording format with LTO-3 and LTO-4 drives. Data recorded to this data cartridge can not be overwritten. NOTE: Write support with Ultrium 920, Ultrium 960, Ultrium 1760 and Ultrium 1840. Read-only support with Ultrium 1760 and Ultrium 1840.	C7973W
	HP LTO4 Ultrium 1.6 TB RW Data Cartridge NOTE: Write and read support with Ultrium 1760 and Ultrium 1840 only.	C7974A
	HP LTO4 Ultrium 1.6 TB WORM Data Cartridge NOTE: Write and read support with Ultrium 1760 and Ultrium 1840 only. NOTE: This data cartridge only supports Write-Once Read-Many recording format with LTO-4 drives. Data recorded to this data cartridge can not be overwritten.	C7974W
	HP LTO1 Ultrium 200 GB Storage Media Kit (includes twenty Ultrium 200GB (C7971A) Data Cartridges, one HP Ultrium Universal Cleaning Cartridge (C7978A), twenty colored labels, and a protective carrying case that can be used to securely store or transport data cartridges)	C8013A
	HP LTO2 Ultrium 400 GB Storage Media Kit (includes twenty Ultrium 400GB (C7972A) Data Cartridges, one HP Ultrium Universal Cleaning Cartridge (C7978A), twenty colored labels, and a protective carrying case that can be used to securely store or transport data cartridges)	C8014A
	HP Ultrium Universal Cleaning Cartridge	C7978A
Rack-mount Options	HP StorageWorks 1U SCSI Rack-Mount Kit NOTE: For racked ProLiant servers. No drives included. Accommodates up to two internal half-height SCSI-based drives (such as the Ultrium 232, Ultrium 448, Ultrium 920 or Ultrium 1760). NOTE: Please refer to web page for further information: http://h18006.www1.hp.com/products/storageworks/1urackmount/index.html	A7445B
	HP Storage Works 1U SAS Rack-Mount Kit NOTE: For racked ProLiant servers. No drives included. Accommodates up to two internal half-height SAS-based drives (such as the Ultrium 448 SAS, Ultrium 920 SAS or Ultrium 1760 SAS). NOTE: Please refer to web page for further information: http://h18006.www1.hp.com/products/storageworks/1urackmount/index.html	AE459A
	HP StorageWorks 3U SCSI Rack-Mount Kit NOTE: For racked ProLiant servers. No drives included. Accommodates up to four internal half-height SCSI-based drives (such as the Ultrium 232, Ultrium 448, Ultrium 920 or Ultrium 1760) or two full-height drives (such as the Ultrium 460, Ultrium 960 or Ultrium 1840). NOTE: Please refer to web page for further information: http://h18006.www1.hp.com/products/storageworks/3urackmount/index.html	274338-B22

Options

	HP StorageWorks 3U SAS Rack-Mount Kit NOTE: For racked ProLiant servers. No drives included. Accommodates up to four internal half-height SAS-based drives (such as the Ultrium 448 SAS, Ultrium 920 SAS or Ultrium 1760 SAS) or two internal full-height SAS-based drives (Ultrium 1840 SAS). NOTE: Please refer to web page for further information: http://h18006.www1.hp.com/products/storageworks/3urackmount/index.html	AG576A
	Tape Array 5300 NOTE: For racked HP-UX or ProLiant servers and other industry-standard racks. Holds up to four offline hot-swap half-height drives (such as the Ultrium 232 array module or a DVD-ROM drive) or up to two offline hot-swap full-height drives (such as the Ultrium 460, Ultrium 960 or Ultrium 1840 array modules). NOTE: Please refer to web page for further information: http://h18000.www1.hp.com/products/storageworks/tapearray5300/index.html?ju mpid=reg_r1002_usen * For the factory racked version, please order C7508AZ	C7508B*
	Redundant, hot-swap power supply and fan for Tape Array 5300	C7496B
Software	Upgrade the included Data Protector Express Single Server Edition backup/recovery software to Data Protector Express. For more information visit: http://www.hp.com/go/dataprotectorexpress/sse/upgrade	BB117ET
Cables and Adapters	68-pin HD/68-pin VHDCI, 12 ft/3.66 m SCSI cable for external drives	341177-B21
	68-pin HD/68-pin HD, 16.40 ft/5 m SCSI cable for external drives	328215-001
	68-pin HD/68-pin HD, 32.81 ft/10 m SCSI cable for external drives	328215-002
	HP StorageWorks Mini-SAS Cable for LTO Internal Tape Drive NOTE: Use this cable to connect HP StorageWorks LTO Ultrium internal tape drives to Mini-SAS (SFF8087) ports.	AP746A
	2M External Infiniband (SFF8470) to Mini-SAS (SFF8088) 1x SAS Cable NOTE: Use this cable to connect HP StorageWorks SAS external tape devices to HP SAS controllers with Infiniband (SFF8470) connectors.	AE466A
	4M External Infiniband (SFF8470) to Mini-SAS (SFF8088) 1x SAS Cable NOTE: Use this cable to connect HP StorageWorks SAS external tape devices to HP SAS controllers with Infiniband (SFF8470) connectors.	AE468A
	2M External Mini-SAS (SFF8088) to Mini-SAS (SFF8088) 1x SAS Cable NOTE: Use this cable to connect HP StorageWorks SAS external tape devices to HP SAS controllers with external Mini-SAS (SFF8088) connectors.	AE470A
	4M External Mini-SAS (SFF8088) to Mini-SAS (SFF8088) 1x SAS Cable NOTE: Use this cable to connect HP StorageWorks SAS external tape devices to HP SAS controllers with external Mini-SAS (SFF8088) connectors.	AE465A
	4M External Mini-SAS (SFF8088) to SAS 4i (SFF8484) 3x/1x Split SAS Cable NOTE: This split cable connects internally to SAS Hard Drive Cage (3x) and externally to the tape device (1x) with other connector attaching to HP SAS controllers with SAS 4i (SFF8484) connectors. The 1x cable occupies additional PCI slot on the server.	AE464A
	4M External Mini-SAS (SFF8088) to Internal Mini-SAS (SFF8087) 3x/1x Split SAS Cable NOTE: This split cable connects internally to SAS Hard Drive Cage (3x) and externally to the tape device (1x) with other connector attaching to the Smart Array P400i	AG452A

Options

	controller inside a DL360 G5 or DL365 G5 server. The 1x cable occupies additional PCI slot on the server.	
	HP Workstation Internal SAS Cable	EH925A
	NOTE: Internal data cable to install Ultrium-LTO SAS HP tape drive in HP Workstation. Has SATA-type data connector on workstation end. Only for HP Workstations.	

Kit Contents

Model Name	Kit Contents Description	Part Number
Ultrium 232 tape drives		
Ultrium 232 SCSI Internal	HP StorageWorks Ultrium 232 SCSI Internal Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities and localized user manuals); HP Data Protector Express Single Server Edition software and its Bare Metal Disaster Recovery option; HP LTO1 Data Cartridge (200 GB); internal SCSI cable; documentation. NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.	DW064A
Ultrium 232 SCSI External	HP StorageWorks Ultrium 232 SCSI External Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities and localized user manuals); HP Data Protector Express Single Server Edition software and its Bare Metal Disaster Recovery option; HP LTO1 Data Cartridge (200 GB); power cord; 68-pin HD to 68-pin VHDCI multi-mode SCSI cable; documentation.	DW065B
Ultrium 448 tape drives		
Ultrium 448 SCSI Internal	HP StorageWorks Ultrium 448 Internal SCSI Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities and localized user manuals); HP Data Protector Express Single Server Edition software and its Bare Metal Disaster Recovery option; HP LTO2 Data Cartridge (400 GB); internal SCSI cable; documentation. NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.	DW016A
Ultrium 448 SCSI External	HP StorageWorks Ultrium 448 External SCSI Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities and localized user manuals); HP Data Protector Express Single Server Edition software and its Bare Metal Disaster Recovery option; HP LTO2 Data Cartridge (400 GB); power cord; 68-pin HD to 68-pin VHDCI multi-mode SCSI cable; documentation.	DW017B
Ultrium 448 SCSI Array Module - works with HP StorageWorks Tape Array 5300	HP Ultrium 448 offline hot-swap SCSI array module; HP StorageWorks Tape CD-ROM (includes HP StorageWorks Library and Tape Tools utilities and localized user manuals); HP Data Protector Express Single Server Edition software and its Bare Metal Disaster Recovery option; HP LTO2 Data Cartridge (400 GB); documentation. NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.	DW019A
Ultrium 448 SCSI Rack-mount - single drive bundled with a 1U Rack-mount kit	Wide SCSI LVD rack-mountable enclosure (1U) with power supply and fan; rail kit; one internal Ultrium 448 SCSI tape drive; power cord; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities and localized user manuals); HP Data Protector Express Single Server Edition software and its Bare Metal Disaster Recovery option; HP LTO2 Data Cartridge (400 GB); documentation. NOTE: 0D1 will appear after this part number on your sales order if factory integration into a rack is indicated.	DW028B
Ultrium 448 SAS Internal	HP StorageWorks Ultrium 448 Internal SAS Tape Drive; HP StorageWorks Tape CD-	DW085A

Options

	ROM (contains HP StorageWorks Library and Tape Tools utilities and localized user manuals); HP Data Protector Express Single Server Edition software and its Bare Metal Disaster Recovery option; HP LTO2 Data Cartridge (400 GB); internal 4-channel split SAS cable; documentation. NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.	
Ultrium 448 SAS External	HP StorageWorks Ultrium 448 External SAS Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities and localized user manuals); HP Data Protector Express Single Server Edition software and its Bare Metal Disaster Recovery option; HP LTO2 Data Cartridge (400 GB); power cord; external 4-channel split SAS cable with PCI slot cover (allows connection inside the server with cable running externally through PCI slot); documentation.	DW086A
Ultrium 920 SCSI Internal	HP StorageWorks Ultrium 920 Internal SCSI Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities and localized user manuals); HP Data Protector Express Single Server Edition software and its Bare Metal Disaster Recovery option; HP LTO3 Data Cartridge (800 GB); internal SCSI cable; documentation. NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.	EH841A
Ultrium 920 SCSI External	HP StorageWorks Ultrium 920 External SCSI Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities and localized user manuals); HP Data Protector Express Single Server Edition software and its Bare Metal Disaster Recovery option; HP LTO3 Data Cartridge (800 GB); power cord; 68-pin HD to 68-pin VHDCI multi-mode SCSI cable; documentation.	EH842A
Ultrium 920 SCSI Rack-mount - single drive bundled with a 1U Rack-mount kit	Wide SCSI LVD rack-mountable enclosure (1U) with power supply and fan; rail kit; one internal Ultrium 920 SCSI tape drive; power cord; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities and localized user manuals); HP Data Protector Express Single Server Edition software and its Bare Metal Disaster Recovery option; HP LTO3 Data Cartridge (800 GB); documentation. NOTE: 0D1 will appear after this part number on your sales order if factory integration into a rack is indicated.	EH903A
Ultrium 920 SAS Internal	HP StorageWorks Ultrium 920 Internal SAS Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities and localized user manuals); HP Data Protector Express Single Server Edition software and its Bare Metal Disaster Recovery option; HP LTO3 Data Cartridge (800 GB); internal 4-channel split SAS cable; documentation. NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.	EH847A
Ultrium 920 SAS External	HP StorageWorks Ultrium 920 External SAS Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities and localized user manuals); HP Data Protector Express Single Server Edition software and its Bare Metal Disaster Recovery option; HP LTO3 Data Cartridge (800 GB); power cord; external 4-channel split SAS cable with PCI slot cover (allows connection inside the server with cable running externally through PCI slot); documentation.	EH848A
Ultrium 1760 SAS Internal	HP StorageWorks Ultrium 1760 Internal SAS Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities and localized user manuals); HP Data Protector Express Single Server Edition software and its Bare Metal Disaster Recovery option; HP LTO4 Ultrium 1.6 TB RW Data Cartridge; internal 4-channel split SAS cable; documentation. NOTE: 0D1 will appear after this part number on your sales order if factory integration	EH919A

Options

	is indicated.	
Ultrium 1760 SAS External	HP StorageWorks Ultrium 1760 External SAS Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities and localized user manuals); HP Data Protector Express Single Server Edition software and its Bare Metal Disaster Recovery option; HP LTO4 Ultrium 1.6 TB RW Data Cartridge; power cord; external 4-channel split SAS cable with PCI slot cover (allows connection inside the server with cable running externally through PCI slot); documentation.	EH920A
Ultrium 1760 SAS Rack-mount - single drive bundled with a 1U Rack-mount kit	Mini-8088 connector SAS rack-mountable enclosure (1U) with power supply and fan; rail kit; one internal Ultrium 1760 SAS tape drive; power cord; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities and localized user manuals); HP Data Protector Express Single Server Edition software and its Bare Metal Disaster Recovery option; HP LTO4 Ultrium 1.6 TB RW Data Cartridge; documentation. NOTE: 0D1 will appear after this part number on your sales order if factory integration into a rack is indicated.	EH946A
Ultrium 1760 SCSI Internal	HP StorageWorks Ultrium 1760 Internal SCSI Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities and localized user manuals); HP Data Protector Express Single Server Edition software and its Bare Metal Disaster Recovery option; HP LTO4 Ultrium 1.6 TB RW Data Cartridge); internal SCSI cable; documentation. NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.	EH921A
Ultrium 1760 SCSI External	HP StorageWorks Ultrium 1760 External SCSI Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities and localized user manuals); HP Data Protector Express Single Server Edition software and its Bare Metal Disaster Recovery option; HP LTO4 Ultrium 1.6 TB RW Data Cartridge; power cord; 68-pin HD to 68-pin VHDCI multi-mode SCSI cable; documentation.	EH922A

Technical Specifications

		Ultrium 232	Ultrium 448	Ultrium 920	Ultrium 1760
Dimensions	Form Factor	5¼-inch half-height	5¼-inch half-height	5¼-inch half-height	5¼-inch half-height
	Physical (HxWxD) Internal	1.6 x 5.7 x 8.1 in (4.1 x 14.5 x 20.6 cm)	1.6 x 5.7 x 8.1 in (4.1 x 14.5 x 20.6 cm)	1.6 x 5.7 x 8.1 in (4.1 x 14.5 x 20.6 cm)	1.6 x 5.7 x 8.1 in (4.1 x 14.5 x 20.6 cm)
	Physical (HxWxD) External	3 x 8.8 x 11.7 in (7.7 x 22.3 x 29.5 cm)	3 x 8.8 x 11.7 in (7.7 x 22.3 x 29.5 cm)	3 x 8.8 x 11.7 in (7.7 x 22.3 x 29.5 cm)	3 x 8.8 x 11.7 in (7.7 x 22.3 x 29.5 cm)
	Physical (HxWxD) Array Module	N/A	1.7 x 6.3 x 11.2 in (4.3 x 16 x 28.5 cm)	1.7 x 6.3 x 11.2 in (4.3 x 16 x 28.5 cm)	1.7 x 6.3 x 11.2 in (4.3 x 16 x 28.5 cm)
	Physical (HxWxD) 1U Rack-mount	N/A	1.7 x 16.88 x 25.25 in (4.32 x 42.88 x 64.14 cm)	1.7 x 16.88 x 25.25 in (4.32 x 42.88 x 64.14 cm)	1.7 x 16.88 x 25.25 in (4.32 x 42.88 x 64.14 cm)
	Physical (HxWxD) 3U Rack-mount	N/A	N/A	N/A	N/A
	Shipping (HxWxD) Internal	11.4 x 17.7 x 12.2 in (29.0 x 45.0 x 31.0 cm)	11.4 x 17.7 x 12.2 in (29.0 x 45.0 x 31.0 cm)	11.4 x 17.7 x 12.2 in (29.0 x 45.0 x 31.0 cm)	11.4 x 17.7 x 12.2 in (29.0 x 45.0 x 31.0 cm)
	Shipping (HxWxD) External	15.4 x 18.7 x 15.4 in (39.0 x 47.5 x 39.0 cm)	15.4 x 18.7 x 15.4 in (39.0 x 47.5 x 39.0 cm)	15.4 x 18.7 x 15.4 in (39.0 x 47.5 x 39.0 cm)	15.4 x 18.7 x 15.4 in (39.0 x 47.5 x 39.0 cm)
	Physical (HxWxD) Array Module	N/A	11.4 x 17.7 x 12.2 in (29.0 x 45.0 x 31.0 cm)	11.4 x 17.7 x 12.2 in (29.0 x 45.0 x 31.0 cm)	N/A
	Shipping (HxWxD) 1U Rack-mount	N/A	12.0 x 23.5 x 33.5 in (30.5 x 59.7 x 85.1 cm)	12.0 x 23.5 x 33.5 in (30.5 x 59.7 x 85.1 cm)	12.0 x 23.5 x 33.5 in (30.5 x 59.7 x 85.1 cm)
	Shipping (HxWxD) 3U Rack-mount	N/A	N/A	N/A	N/A
Weight	Out of box, Internal	3.2 lb (1.45 kg)	3.2 lb (1.45 kg)	3.2 lb (1.45 kg)	3.2 lb (1.45 kg)
	Out of box, External	10.3 lb (4.65 kg)	10.3 lb (4.65 kg)	10.3 lb (4.65 kg)	10.3 lb (4.65 kg)
	Out of box, Array Module	N/A	4.1 lb (1.85 kg)	4.1 lb (1.85 kg)	N/A
	Out of box, 1U Rack-mount	N/A	21.0 lb (9.52 kg)	21.0 lb (9.52 kg)	21.0 lb (9.52 kg)
	Out of box, 3U Rack-mount	N/A	N/A	N/A	N/A
	Shipping, Internal	7.9 lb (3.6 kg)	7.9 lb (3.6 kg)	7.9 lb (3.6 kg)	7.9 lb (3.6 kg)
	Shipping, External	17.6 lb (8.0 kg)	17.6 lb (8.0 kg)	17.6 lb (8.0 kg)	17.6 lb (8.0 kg)
	Shipping, Array Module	N/A	8.8 lb (4.0 kg)	8.8 lb (4.0 kg)	N/A
	Shipping, 1U Rack-mount	N/A	32.9 lb (14.8 kg)	32.9 lb (14.8 kg)	32.9 lb (14.8 kg)
	Shipping, 3U Rack-mount	N/A	N/A	N/A	N/A

Technical Specifications

Capacity	Native	100 GB	200 GB	400 GB	800 GB
	Compressed (assumes 2:1 data compression)	200 GB	400 GB	800 GB	1.6 TB
	Buffer Size	64 MB	64 MB	64 MB	128 MB
Performance	Sustained transfer rate, native	16 MB/s	24 MB/s	60 MB/s	80 MB/s
	Sustained transfer rate, compressed (assumes 2:1 data compression)	32 MB/s	48 MB/s	120 MB/s	160 MB/s
	Burst transfer rate	160 MB/s (with Ultra3 SCSI wide)	160 MB/s (with Ultra3 SCSI wide); 300 MB/s (with 3Gb/sec SAS)	320 MB/s (with Ultra320 SCSI); 300 MB/s (with 3Gb/sec SAS)	300 MB/s (with 3Gb/sec SAS)
	Data rate matching range	0-16 MB/s (native)	0-24 MB/s (native)	20-60 MB/s (native)	33-80 MB/s (native)
	Data access time (from BOT)	64 s typical for a 100 GB tape (native)	64 s typical for a 200 GB tape (native)	64 s typical for a 200 GB tape (native)	64 s typical for a 800 GB tape (native)
	Average load time	17 s	17 s	17 s	17 s
	Average unload time	16 s	16 s	16 s	16 s
	Rewind time from EOT	121s (100 GB tape)	121 s (200 GB tape)	121 s (200 GB tape)	121 s (200 GB tape)
	Rewind tape speed	5.0 m/s	5.0 m/s	5.0 m/s	5.0 m/s
Reliability	MTBF	250,000 hours at 100% duty cycle	250,000 hours at 100% duty cycle	250,000 hours at 100% duty cycle	250,000 hours at 100% duty cycle
	Uncorrected Error Rate	$1x10^{17}$	$1x10^{17}$	$1x10^{17}$	1x1017
Media Compatibility		LTO Ultrium 1 (Read and Write)	LTO Ultrium 1 (Read and Write); LTO Ultrium 2 (Read and Write)	LTO Ultrium 1 (Read only); LTO Ultrium 2 (Read and Write); LTO Ultrium 3 (Read and Write)	LTO Ultrium 2 (Read only); LTO Ultrium 3 (Read and Write); LTO Ultrium 4 (Read and Write)

Technical Specifications

Tape Format	Recording method	8-channel linear serpentine	8-channel linear serpentine	16-channel linear serpentine	16-channel linear serpentine
	Recording format	LTO Ultrium 1	LTO Ultrium 2 LTO Ultrium 1 (for 100 GB tape)	LTO Ultrium 3 LTO Ultrium 2 (for 200 GB tape)	LTO Ultrium 4 LTO Ultrium 3 (for 400 GB tape)
	Data compression	LTO DC dual mode compression (an enhanced version of ALDC)	LTO DC dual mode compression (an enhanced version of ALDC)	LTO DC dual mode compression (an enhanced version of ALDC)	LTO DC dual mode compression (an enhanced version of ALDC)
	Error detection/correction	Reed-Solomon	Reed-Solomon	Reed-Solomon	Reed-Solomon
	Read channel technology	Partial Response Maximum Likelihood (PRML)	Partial Response Maximum Likelihood (PRML)	Partial Response Maximum Likelihood (PRML)	Partial Response Maximum Likelihood (PRML)
	Data encoding method	RLL 1,7	RLL 0,13/11	RLL 0,13/11	RLL 0,13/11
Interface	Interface type	Wide Ultra3 SCSI (LVDS)	Wide Ultra3 SCSI (LVDS) or 3Gb/sec SAS	Ultra320 SCSI (LVDS) or 3Gb/sec SAS	Ultra320 SCSI (LVDS) or 3Gb/sec SAS
	SCSI connector	Internal: 68-pin LVDS External: 68-pin HD LVDS	SCSI Internal: 68-pin LVDS SCSI External: 68-pin HD LVDS SCSI Array module: 80-pin SCA (SCSI and power) SCSI Rack-mount: 68-pin HD LVDS SAS Internal: mini-SAS SFF8482 SAS External: mini-SAS SFF8088	SCSI Internal: 68-pin LVDS SCSI External: 68-pin HD LVDS SCSI Rack-mount: 68-pin HD LVDS SAS Internal: mini-SAS SFF8482 SAS External: mini-SAS SFF8088	SCSI Internal: 68-pin LVDS SCSI External: 68-pin HD LVDS SAS Internal: mini-SAS SFF8482 SAS External: mini-SAS SFF8088

Technical Specifications

Power Specifications	Power requirements, Internal (including rack-mount model)	+5V@2.5A (typical) +5V@2.5A (max) +12V@0.7A (typical) +12V@2.1A (max)	+5V@2.5A (typical) +5V@2.5A (max) +12V@0.7A (typical) +12V@2.1A (max)	+5V@2.5A (typical) +5V@2.5A (max) +12V@0.7A (typical) +12V@2.1A (max)	+5V@2.5A (typical) +5V@2.5A (max) +12V@0.7A (typical) +12V@2.1A (max)
	Power requirements, External	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.7A max	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.7A max	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.7A max	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.7A max
	Power requirements, Array Module	N/A	+5V@2.5A (typical) +5V@2.5A (max) +12V@0.7A (typical) +12V@2.1A (max)	+5V@2.5A (typical) +5V@2.5A (max) +12V@0.7A (typical) +12V@2.1A (max)	N/A
	Power consumption	13 Watts idle 20 Watts typical 33 Watts max	13 Watts idle 20 Watts typical 33 Watts max	13 Watts idle 20 Watts typical 33 Watts max	13 Watts idle 20 Watts typical 33 Watts max

Environmental Specifications	Temperature range	Operating: 50° F to 95° F (10° C to 40° C) at a minimum of 6CFM airflow Storage: -40° F to 151° F (-40° C to 66° C)
	Non-condensing humidity range	Operating: 20 to 80% RH (non-condensing) Storage: 10 to 95% RH (non-condensing)

Standards Compliance	CSA Certification to C22.2, No.60950 (cCSAus) TÜV EN60950 (IEC 60950) CE Declaration of Conformity FCC 47 CFR Parts 15 NOM VCCI C-TICK RRL BSMI GOSH CB Certificate and Report (IEC 60950)

Technical Specifications

Front Panel LED Indicators

HP Ultrium half-height tape drives have four LED indicators on the front panel:

- Ready
- Drive
- Tape
- Clean

Please consult the HP StorageWorks Ultrium Tape Drive documentation for more information on how to use these LED indicators for ascertaining drive status and for help in troubleshooting your HP Ultrium tape drive.

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For tape drives and media, 1 GB = 1 billion bytes. Actual formatted capacity is less.